WBS 3.0 C-0 Outfitting

Tom Lackowski

WBS 3.0

Overview

- Introduction
- Components of C-0 Outfitting
- Organization Chart
- Technical Description
- Project Planning and Management Overview
- ES&H

Introduction

- WBS 3.0, C-0 Outfitting provides the architectural, structural, mechanical and electrical finish-out work for the BTeV detector in the existing C-0 Building. Requirements for this task is providing by WBS 1.10, Infrastructure.

- WBS 3.0 also provides the modifications to the Main Ring C-0 Service Building and primary power for WBS 2.0, Interaction Region.

C-0 Components

- C-0 Building
  - Architectural and structural finish out including:
    - Two Mezzanine floors
    - Stairs, elevator, partitions, toilet rooms.
    - Floor and wall finishes including raised computer floors.
  - Mechanical Systems
    - HVAC systems including collision hall and assembly hall purge.
    - Chilled water system, chiller, pumps, and distribution piping.
    - High density computer room cooling.
    - Fire protection throughout the facility.
  - Electrical
    - Primary Power – 3 - 1500 KVA substations.
    - Three distribution subsystems; power supplies, quiet electronics, & house power.
    - 250 KVA Generator.

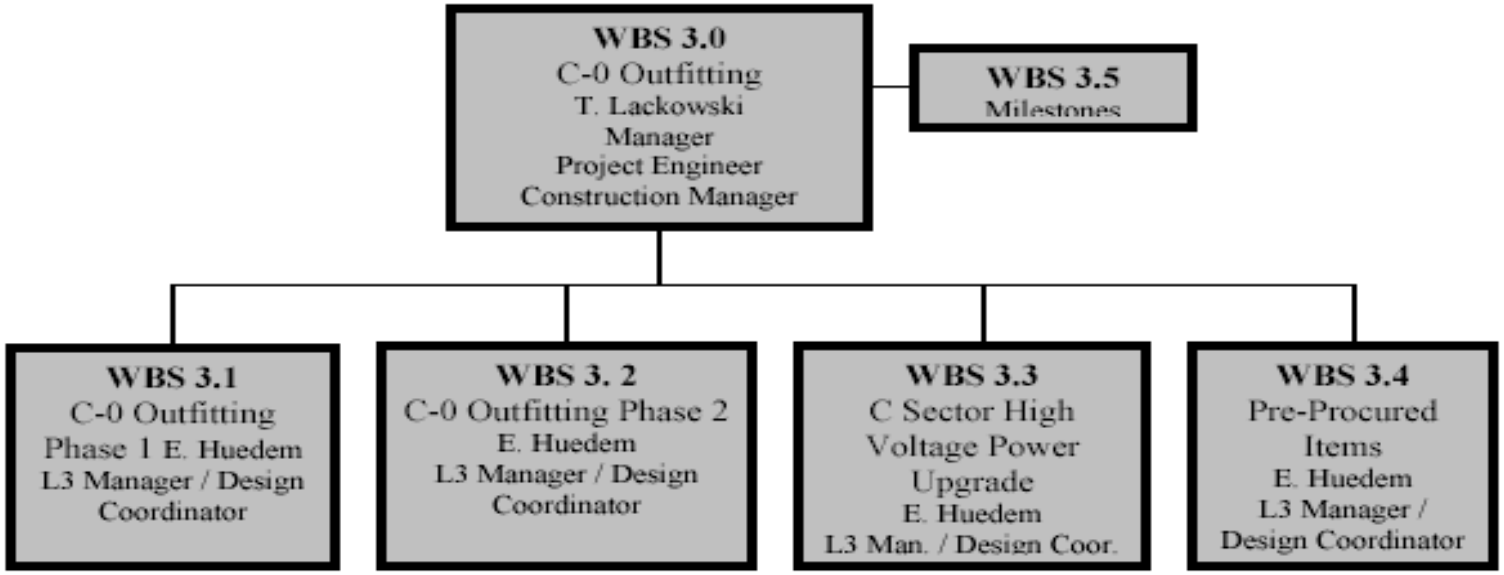
IR & Infrastructure Components

- IR Support
  - Primary Power; 1500 KVA transformer at C-0, 500 KVA transformers at B-4 and C-1.
  - 480 V secondary including panel boards.
  - Minor C-0 Service Building Architectural Modification.
  - Heated enclosure for outside bus between C-0 Service Building and penetrations leading to enclosure.

- Infrastructure
  - 13.8 KV feeder from Kautz Road Substation to C-0 Building.

Organization

Base cost $6.0M (M+S: $4.9M Labor: $1.1M)

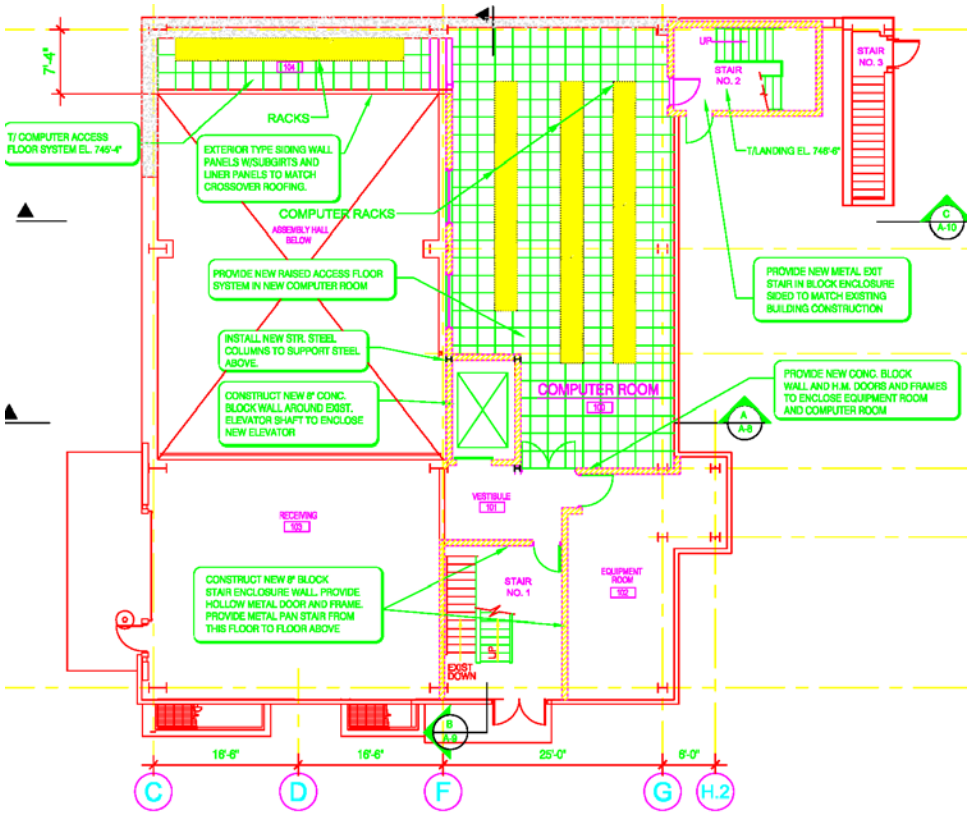


FESS Engineering		
CIVIL C. Federowicz	DDC CONTROLS L. Hammond	CONSTRUCTION MANAGEMENT OFFICE Manager – T. Lackowski Construction Coor. - TBD Procurement – R. Cypret Legal - TBD Environment – R. Walton Health & Safety - M. Heflin
ARCHITECTURAL G. Van Zandbergen	PROCESS PIPING SYSTEMS L. Hammond	
STRUCTURAL T. Lackowski	FIRE PROTECTION FIRE DETECTION J. Neihoff	
MECHAICAL SYSTEMS E. Huedum	ELECTRICAL Hanson Engineering	

Current Conditions

- In 1998 Fermilab constructed a Collision Hall and very basic building shell at the Main Ring C-0 Station.
- The project “C-0 Test Area” was constructed safely, on time, and within budget.
- UIP project stubbed in adequate ICW (Fire Protection water), Domestic Water, Sanitary Sewer, and natural gas.

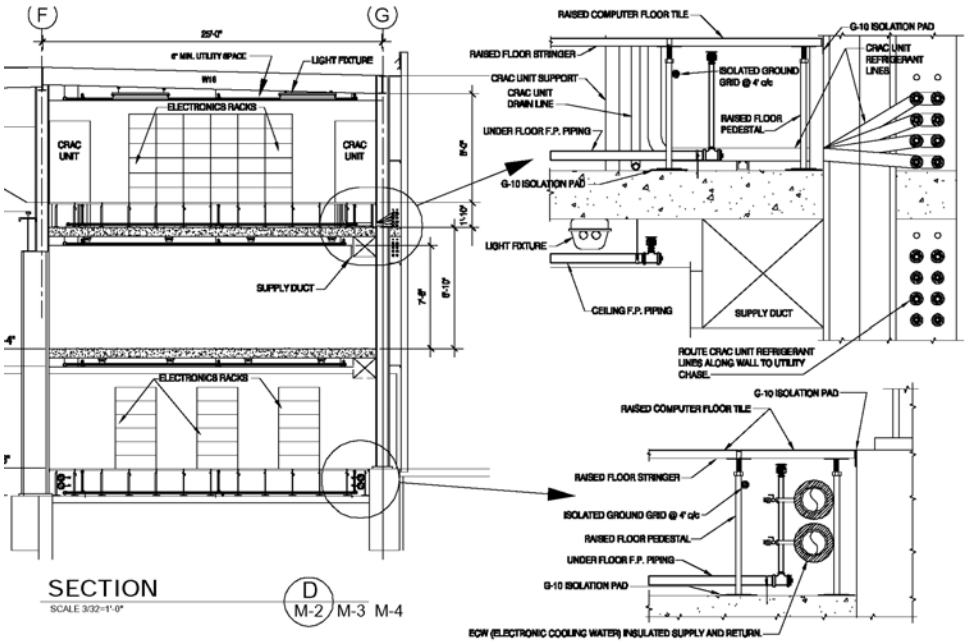
C-0 Outfitting Phase I



- The scope of Phase I is those items of work required to give Beneficial Occupancy of the Assembly Hall at El. 715 and the Receiving Area to allow magnet and torroid construction to begin.
- Installs the Mezzanine and concrete block partitions, stairs, elevator, toilet rooms, fire protection, fire detection and power to test analysis magnets.
- Start ASAP
- Beneficial Occupancy by February 1, 2006.

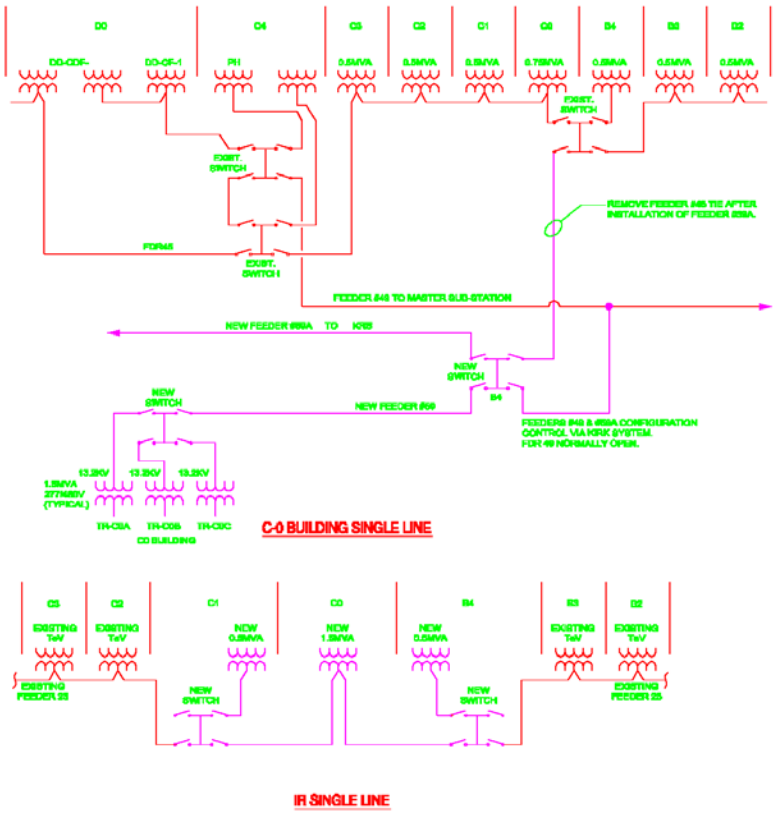
C-0 Outfitting Phase II

- Completes remainder of scope in and around C-0 Building.
- Installs HVAC, chilled water, high density computer room cooling, raised computer floors, finishes,remaining primary power, user and house power distribution.
- Delay start of this work will allow us to take advantage of continuing development of high density cooling systems.



- Start Design Mid FY ’06
- Start Const. Early FY ’07
- Finish Late FY ‘07

C Sector High Voltage Upgrade



- Installs IR feeder connections to feeder 23 at C-0, B-4 and C-1.
- Installs new feeder 59A from KRS to B-4.
- Start early FY ‘06
- Finish early FY ‘07

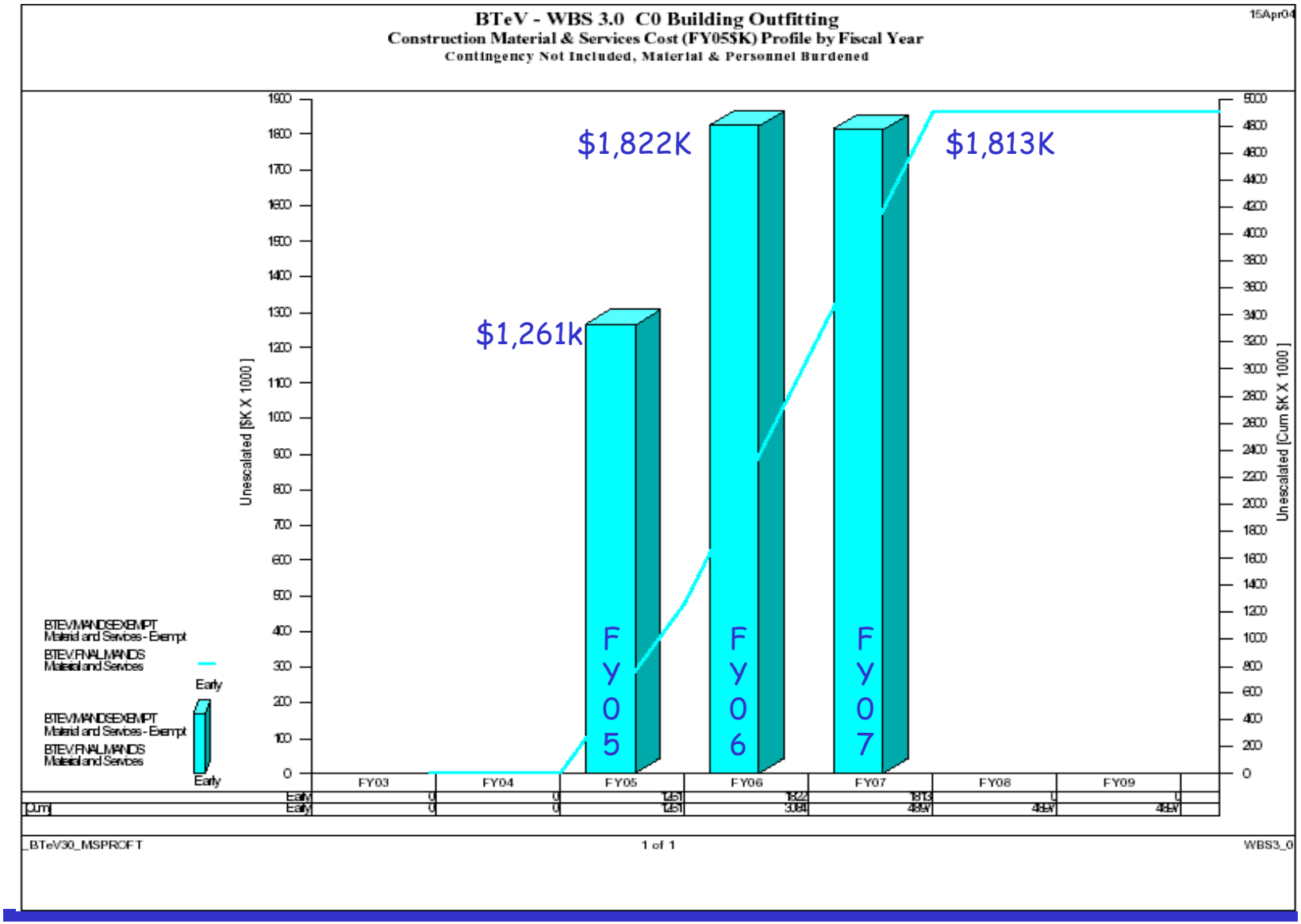
Misc. Quantities

- Structural Steel – 17.1 tons
- Structural Concrete – 95 cubic yards
- Concrete Masonry – 8400 sf
- Chillers – 120 tons
- High Density Cooling - 120 tons
- Major HVAC systems - 2
- New Fire Protection coverage – 9600 sf
- Installed Primary Power – 7 MVA
- 13.8 kv Feeder - 11,000 ft.
- 2000 amp switchboards – 4
- Electrical Distribution Panels – 22
- Motor Control Centers - 2

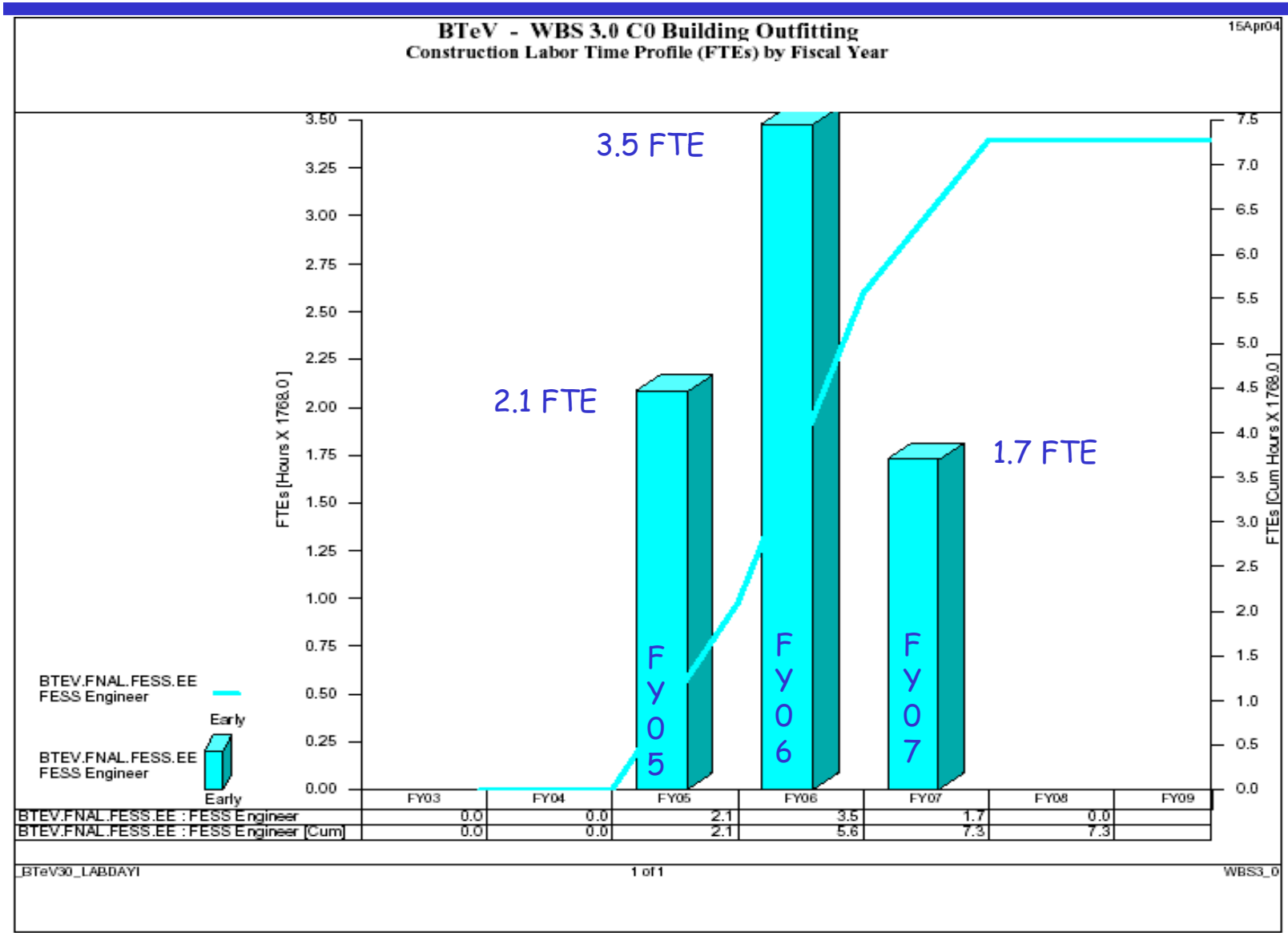
Construction Cost

Activity ID	Activity Name	Base Cost ($)	Material Contingency (%)	Labor Contingency (%)	Total FY05	Total FY06	Total FY07	Total FY08	Total FY09	Total FY05-09
3.1	C-0 Outfitting Phase 1	2,239,247	20	20	1,711,199	975,897	0	0	0	2,687,096
3.2	C-0 Outfitting Phase 2	2,303,103	22	20	0	280,303	2,519,673	0	0	2,799,976
3.3	C Sector High Voltage Power Upgrade	774,720	20	20	0	929,664	0	0	0	929,664
3.4	Pre Procured Items	663,685	20	20	174,539	621,883	0	0	0	796,422
3	**Subproject 3.0**	**5,980,754**	**21**	**20**	**1,885,738**	**2,807,747**	**2,519,673**	**0**	**0**	**7,213,157**

M&S Obligation Profile by Fiscal Year

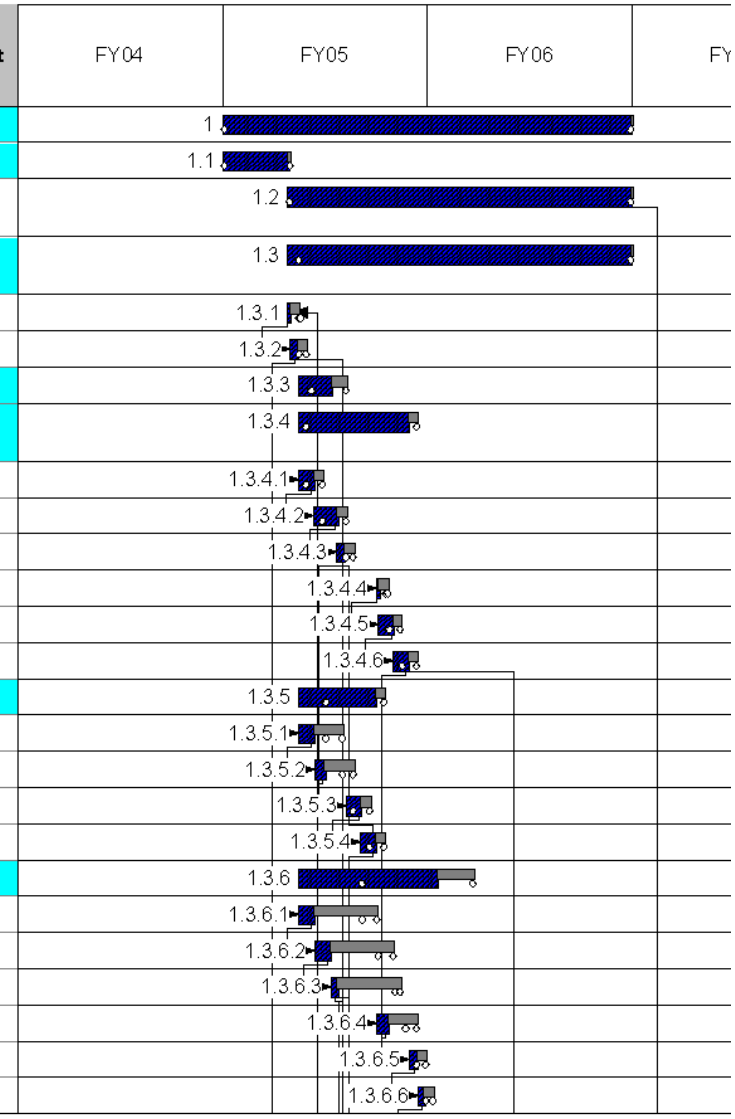


Labor Profile by Fiscal Year

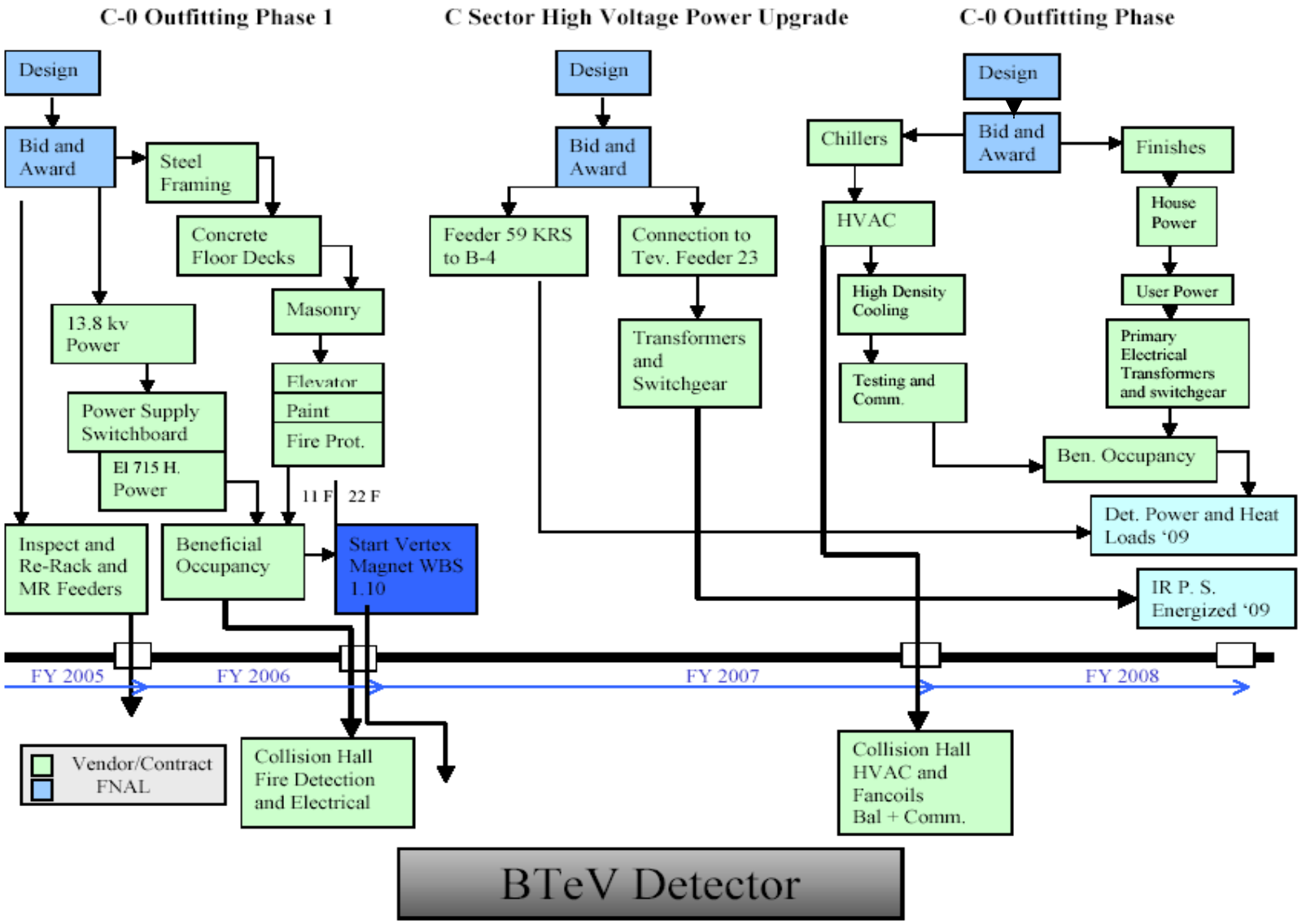


Partial Gantt Chart

Activity ID	Activity Description	Early Start	Early Finish	Float
1	C-0 Outfitting Phase 1	01Oct04	28Sep06	1d
1.1	Design to Award C-0 Phase 1	01Oct04	27Jan05	1d
1.2	Title 3 EDIA C-0 Outfitting Phase 1	**28Jan05**	**28Sep06**	**1d**
1.3	C-0 Outfitting Phase 1 Construction Contract	28Jan05	28Sep06	1d
1.3.1	Notice to Proceed	**28Jan05**	**28Jan05**	**11d**
1.3.2	Mobilize	**31Jan05**	**11Feb05**	**11d**
1.3.3	Site Concrete	14Feb05	15Apr05	16d
1.3.4	Structural Steel & Weather Enclosures	14Feb05	29Aug05	11d
1.3.4.1	S & A Steel Shop Drawings	**14Feb05**	**11Mar05**	**11d**
1.3.4.2	Fab and ship Steel	**14Mar05**	**22Apr05**	**11d**
1.3.4.3	Erect Structural Steel	**25Apr05**	**06May05**	**11d**
1.3.4.4	Install Steel Stairs and misc.	**04Jul05**	**07Jul05**	**11d**
1.3.4.5	Siding & Roofing	**08Jul05**	**01Aug05**	**11d**
1.3.4.6	Electronics Bridge	**02Aug05**	**29Aug05**	**11d**
1.3.5	Structural Concrete	14Feb05	01Jul05	11d
1.3.5.1	S & A Rebar and Tendons.	**14Feb05**	**14Mar05**	**36d**
1.3.5.2	Fab Rebar and Tendons	**15Mar05**	**01Apr05**	**36d**
1.3.5.3	FBP Concrete @ El. 744'	**09May05**	**03Jun05**	**11d**
1.3.5.4	FBP Concrete @ El 764'	**06Jun05**	**01Jul05**	**11d**
1.3.6	Concrete Masonry	14Feb05	18Oct05	11d
1.3.6.1	S & A Masonry SD	**14Feb05**	**14Mar05**	**81d**
1.3.6.2	S & A Doors and Glass	**15Mar05**	**12Apr05**	**81d**
1.3.6.3	Concrete Masonry El 715-0	**13Apr05**	**25Apr05**	**81d**
1.3.6.4	Concrete Masonry El 731'-4	**04Jul05**	**22Jul05**	**37d**
1.3.6.5	Concrete Masonry El 746-6	**30Aug05**	**14Sep05**	**11d**
1.3.6.6	Concrete Masonry El 755-4	**15Sep05**	**27Sep05**	**11d**



Description of Project Flow



Key Milestones

- Activity ID Activity Description Finish
- 3.5.1 Lev2Mil: MS-1 Start Engineering Oct04
- 3.5.2 Lev1Mil: MS-2 Start Construction Jan05
- 3.5.3 Levl3Mil: MS-3 Side Bay. Struct. Complete Oct05
- 3.5.4 Levl3Mil: MS-4 Temp. Power Operational (Fdr 45) Nov05
- **3.5.5 Lev1Mil: MS-5 Beneficial Occupancy of lower level And upper staging area** Jan06
- 3.5.6 Lev2Mil: MS-6 Collision Hall Complete Sept07
- 3.5.7 Levl3Mil: MS-7 MECH Systems Complete (Ex.CH) Aug07
- 3.5.8 Levl3Mil: MS-8 Electrical Systems Complete Aug07
- 3.5.9 Lev2MIL: MS-9 Assembly, Service Building Construction
- Complete Sept07
- 3.5.10 Lev2Mil: MS-10 Engineering Complete Nov07

Critical Path Analysis

- C-0 Outfitting Phase 1 (11 days of float to target date)
  - Float calculated targeting the Level 1 Milestone, **"Beneficial Occupancy of lower level and upper staging area".** This milestone leads to the start of the Vertex Magnet construction start. (Vertex magnet const. has an additional 21 days of float.)
- C-0 Outfitting Phase 2
  - Float in Open Plan schedule calculated on early finish date of project completion, forcing 0 float. Early finish date for phase 2 is Sept. '07. WBS 1.10 "need by" date is Feb. '08.
- C Sector High Voltage Upgrade
  - Float is calculated with respect to the start of C-0 Outfitting Phase 2, completing in Oct. '06, and allowing 19 days of float. The Detector and the IR do not require this power until early 2009.

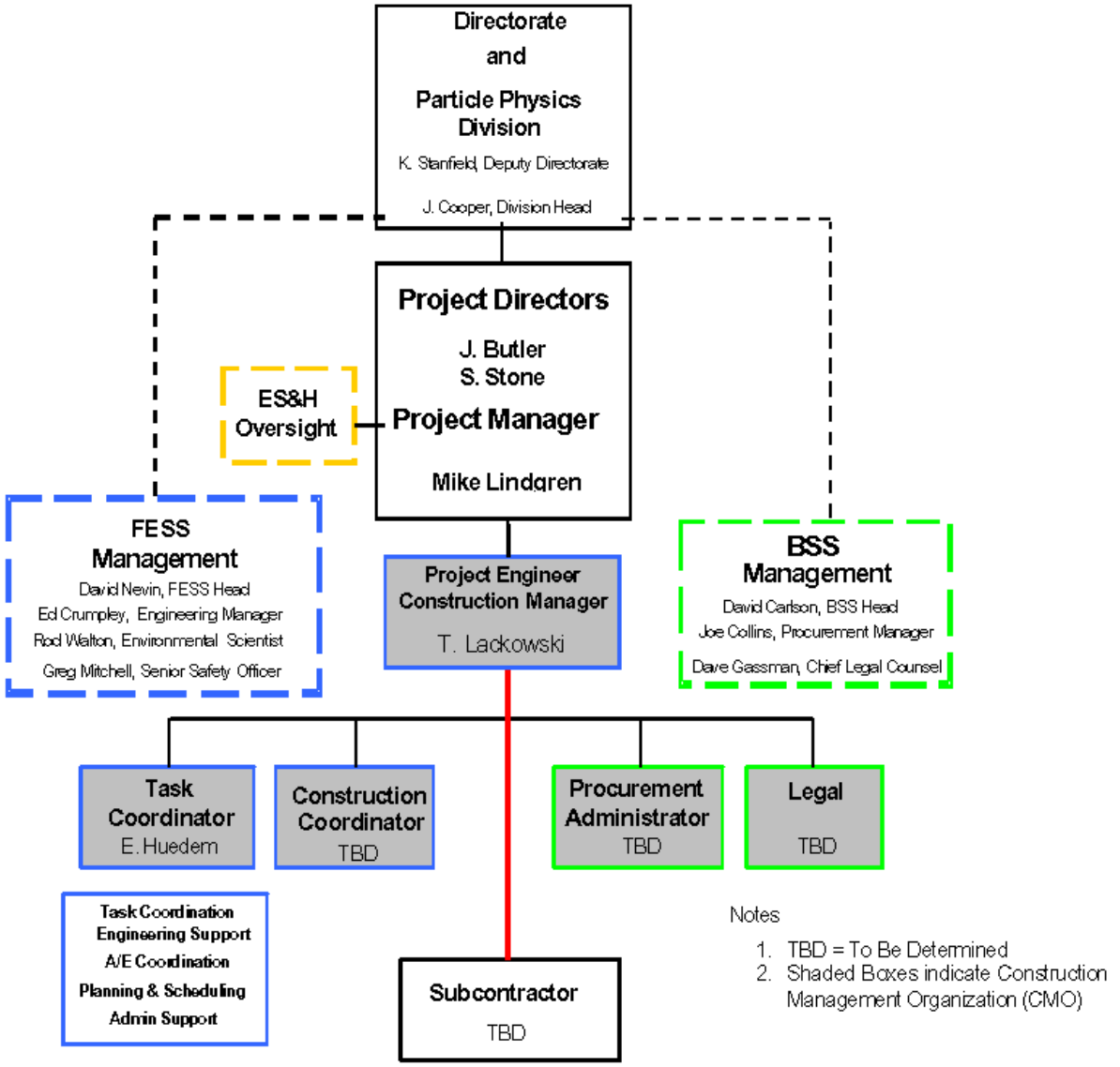
Cost and Schedule Summary

- WBS 3.0 TEC is within acceptable project limits.
- Fiscal Cost and Commitment profile conforms to project's fiscal cost profile.
- Estimate contains 20% contingency for design, C-0 Outfitting Phase 1 and C-Sector H.V. Upgrade. 22% contingency used for C-0 Outfitting Phase 2.
- Cost developed using Means Cost Data, manufacturers quotes, and DOE guidelines for EDIA and Management Reserve.

Risk Analysis

- Technical
  - The methods of construction, materials and installation conditions are consistent with industry standards.
- Economic Factors
  - Currently the local construction industry is depressed. Later year construction is burdened with a slightly increased contingency to account for a possible up-swing in the economy and the construction industry.

Line Management



ES&H

- The ability to perform the construction work safely will be designed into the project.
- The Construction Manager shall be the first line of contact with the Construction Subcontractor's organization.
- During construction the Subcontractors will use Project Hazard Analyzes (PHA) to plan the work and mitigate hazards.
- Goal is zero accidents.

- Project NEPA has been approved as a Categorical Exclusion (CX).

In Summary

- The documents presented provide a design, cost estimate and schedule based on sound, professional engineering. Thanks to Emil Huedem, Gary Van Zandbergen, Jim Niehoff and Hanson Engineering.
- The WBS 3.0; C-0 Outfitting CDR provides the scope, cost and schedule consistent with the requirements of the BTeV project.